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**The Climatology of the United States.** By A. J. Henry. United States Department of Agriculture, Weather Bureau, Bulletin Q. 4to. Washington, D. C., 1906. pp. 1012. Pls. 34. Figs. 7.

The situation regarding the publication of climatological data for the United States has been very unsatisfactory. Meteorologists abroad have frequently, in private conversation and correspondence, as well as in print, found fault with the Weather Bureau—and justly, too—for not publishing, in one volume, in fairly complete form, such data as are universally regarded as essential to an adequate understanding of our climate. To be sure, the Annual Reports of the Chief of the Weather Bureau contain, from year to year, summaries of the ordinary meteorological records for the year, and usually also some tabulations for longer periods of different important climatological data not otherwise accessible. But since Blodgett's famous classic, "The Climatology of the United States," published in 1857, there has been no attempt to collect, in one volume, with adequate discussion, complete summaries for the different meteorological stations scattered over the United States. Teachers and students who have sought anything like a fairly complete presentation of the climatology of the United States have been forced to search through many volumes of the Reports of the Chief of the Weather Bureau, Weather Bureau Bulletins, publications of the various State sections of the climate and crop service of the Weather Bureau, and the like—in short, the task has been burdensome, time-consuming, and highly unsatisfactory.

At the Washington meeting of the International Geographic Congress, held in September, 1904, Professor A. J. Henry presented a paper on "A Climatological Dictionary of the United States," in which he announced the forthcoming publication of a report, such as that which has so long been needed. The announcement was welcomed in Europe, and for the past year many workers in meteorology in various parts of the world have been waiting for the appearance of the volume, the proof-sheets of which—through the courtesy of Professor Henry—are before us. We may say that we accord this publication a very hearty welcome, because of the great help it will be to all teachers of geography; because it will spread sound information among our own people concerning the climatology of their own country, but chiefly because it will tend to silence some of the well-deserved criticisms which have been so often heard regarding our inexcusable inactivity in presenting, in compact form, and according to recognized standards, the results of the many years of observations which are in the possession of the Weather Bureau. As the Chief of the Bureau rightly says in the Preface to this Bulletin: "While climatological observations have been steadily accumulating for the last quarter of a century, the general results are inaccessible, not only to the general public, but also to the majority of students and investigators interested in the advancement of scientific agriculture in the United States. The work herewith aims to present in form for ready reference comparative climatic statistics for the different portions of the United States, accompanied by explanatory charts and text."

The data in this volume cover, generally speaking, the period 1870-1903, and include those collected primarily for weather-map purposes, and also those obtained by the voluntary observers for purely climatic purposes. In the first part of the book we find a discussion, somewhat too brief to be altogether satisfactory, of the general controls of the *climates* (we prefer the word in the plural when applied to so large an area) of the United States; and here we are especially pleased to note the attention paid to cyclonic and anticyclonic control of climate, the classes of cyclones and anticyclones, their tracks, and their control of weather changes. Many illus-

trative maps accompany this discussion. In a paper read before the Eighth International Geographic Congress, entitled "Suggestions concerning a more Rational Treatment of Climatology," the reviewer pointed out the need of emphasis on the cyclonic and anticyclonic units in presenting climatological data, and gave a series of curves to show how the tracings of self-recording instruments can be used in this connection. Professor Henry gives three figures showing similar curves, illustrating the weather changes accompanying the passage of cyclones and anticyclones across the country. If such typical curves could be discussed for different sections of the United States, we should have a climatology of the United States unique in character, effective in presentation, and easily understood. Such a work we ourselves have had in hand, but have been handicapped by lack of time and by the impossibility of securing the self-recording instrument sheets needed in this investigation.

The discussion of temperature, precipitation, relative humidity, fog, sunshine, and winds is, in the case of temperature, more complete than anything yet presented, and is modelled on the standard series of data set forth by Hann in his well-known "Handbuch der Klimatologie," and long since adopted as the model for all such work. New calculations have been made in several cases, and many new charts are given. We note data regarding the greatest amount of snow which has fallen in any twenty-four hours, which we believe to be new. This textual descriptive portion of the volume covers 84 pages, and includes mention of such phenomena as cold and hot waves, thunderstorms, tornadoes, chinook winds, etc., and at the end some discussion of seasonal variations of the weather. These first 84 pages make up that part of the book which will be most generally read. They present, with the numerous and well-chosen illustrations, an adequate picture of the climatology of the United States for the general reader, or for the student.

Following this text we find General Tables, including the following: monthly and annual mean temperatures for selected stations; absolute maximum and minimum temperatures for selected stations, with year of occurrence (1871-1903); monthly and annual mean maximum and mean minimum temperatures for 32 stations; absolute range of monthly mean temperatures at selected stations; monthly and annual mean precipitation for selected stations; average number of days with 0.01 inch or more of precipitation for selected stations; monthly and annual mean relative humidity for selected stations; mean monthly and annual percentages of sunshine; prevailing winds for selected stations. After these general tables, and occupying by far the larger part of the volume, come condensed summaries, grouped by the different sections and States, for the regular and voluntary observer stations of the Weather Bureau, with a brief statement as to the location of each station; the duration of the record; the exposure of the instruments, etc. A special discussion, usually very brief, but in some cases quite extended, of the physical features and of the climate of each State, precedes the tables, which include monthly seasonal and annual means, and dates of temperature extremes, usually for the period Jan. 1, 1894, to Dec. 31, 1903.

Our notice of the "Climatology of the United States" has been extended to a rather unusual length, but we feel that the volume is of such importance that it deserves such distinction. Several suggestions as to changes, additions, or improvements will doubtless occur to any one who examines the *Bulletin* critically. As for ourselves, we prefer to welcome this most useful compilation as a great advance on anything which we have had hitherto, and abstain from such suggestion except in one case. We do not find specific mention in all cases of the methods of reduction employed in constructing the climatological charts, nor of the fact whether the observa-

tions were reduced to the same period of time. These matters seem to us of fundamental importance, and one of the most thoroughly-justified and most frequently-made criticisms of our climatological work in this country concerns this very matter of publishing data and charts in which the observations were not reduced to the same periods of time. But, on the other hand, we now have something, where previously we had hardly anything. The work, as we happen to know, was carried on by Professor Henry under many disadvantages, and in the midst of other duties. As it stands, it represents a body of material of immense value, now rendered accessible to any one who wishes to secure it. This *Bulletin* will certainly help greatly in the advance of a more rational and systematic study of the climatology of the United States. It will receive a hearty welcome at the hands of climatologists the world over.

R. DEC. W.

**Climatological Atlas of India.** Published by the Authority of the Government of India under the Direction of Sir John Eliot, K.C.I.E., F.R.S., late Meteorological Reporter to the Government of India and Director-General of Indian Observatories. Issued by the Indian Meteorological Department, 1906, fol. Pp. XXXII. Pls. 120. (Price in the United Kingdom, 36 shillings.)

It is surely seldom that a reviewer has so wholly satisfactory a task as that which falls to our lot in calling attention to the new *Climatological Atlas of India*—a work of art of the highest order of cartographic excellence, and a climatological publication which must certainly rank among the very foremost of all the volumes which have been devoted to climatology or to meteorology. This *Atlas* at once recalls the magnificent *Atlas of Meteorology* (Vol. III of Bartholomew's *New Physical Atlas*) of 1899; for these two volumes are much alike in size and in the general excellence of their make-up, the well-known house of Bartholomew, in Edinburgh, having produced the charts in both of them. It also brings to mind the fine climatological atlas of the Russian Empire, of the year 1900, published by Rykatcheff, Director-General of the Central Physical Observatory at St. Petersburg, as a memorial volume in commemoration of the fiftieth anniversary of the foundation of that institution.

The *Climatological Atlas of India* was prepared by Sir John Eliot, lately Meteorological Reporter to the Government of India, a man widely known for his activities in that trying position, and for numerous publications on the meteorology of India. The data used in the preparation of the charts are chiefly those recorded during the first twenty-five years (1876–1900) of the operations of the Indian Meteorological Department. We learn from the Preface, to our great satisfaction, that a Handbook of the meteorology of India is now in course of preparation, in which a full statement of all the more important features of the climates and weather of India will be given and which will supplement the *Atlas*. Together these two volumes will give a presentation of the meteorological conditions of India without a parallel in any part of the world. Meteorological work and investigation in India have for years been known the world over. From the time of Piddington's famous "First Memoir on the Law of Storms," published in 1839, the names of many Indian meteorologists who have made a mark in the progress of the science have become familiar—*e. g.*, Wilson, Chambers, Dallas, Hill, Blanford, and Eliot. Last, but certainly not destined to be least, comes Dr. Gilbert T. Walker, the present Meteorological Reporter to the Government of India, who, although but recently called to that important office, has already shown that he is the right man in the right place, and that he will be a worthy successor to Blanford and Sir John Eliot. Fascinating India certainly is in its unique variety of climates; in its stupendous problems of famine and flood; in the possibility